

III/IV B.Tech. FIRST SEMESTER

DATABASE MANAGEMENT SYSTEMS

Course Code : CS5T1**Credits: 3****Lecture: 3 periods/ week****Internal assessment: 30 Marks****Tutorial: 1period/week****Semester end examination: 70 Marks**

Prerequisites: Data Structures, File Structures

Course Objectives:

1. The main objective of this course is to enable students to the fundamental concepts of database analysis and design.
2. To recognize the importance of database analysis and design in the implementation of any Database application and to understand the process of drawing the ER-Diagrams.
3. It also gives the knowledge of the roles of transaction processing and concurrency control.

Course Outcomes:

CO1) Understand the basic principles of database management systems.

CO2) Design Entity-Relationship diagrams to represent simple database application scenarios.

CO3) Develop relational tables and sql queries for a given context in relational database.

CO4)Apply normalization techniques to a given database application.

CO5) Describe transaction processing and concurrency control.

Syllabus:**UNIT 1****Introduction to Databases:** Characteristics of the Database Approach, Advantages of using the DBMS Approach, A Brief History of Database Applications.**Overview of Database Languages and Architectures:** Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, Database System environment, Centralized and Client-Server Architecture for DBMSs.**UNIT 2****Relational Model:** The Relational Model Concepts , Relational Model Constraints and Relational Database Schemas.**SQL:** Data Definition, Constraints, and Basic Queries and

Updates, **SQL: Advanced Queries**, Assertions, Triggers, and Views.

Formal Relational Languages: Relational Algebra: Unary Relational Operations: Select and Project, Relational Algebra Operations from Set Theory, Binary Relational Operations: Join and Division, Examples of Queries in Relational Algebra.

UNIT 3

Conceptual Data Modeling : High-Level Conceptual Data Models for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship Types of Degree Higher Than Two Relational Database Design Using ER-to-Relational Mapping.

UNIT 4

Database Design Theory : Functional Dependencies, Normal forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multi valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

UNIT 5

Transaction Processing: Introduction, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability & Serializability, Transaction Support in SQL.

Introduction to Concurrency Control: Two-Phase Locking Techniques: Types of Locks and System Lock Tables, Guaranteeing Serializability by Two-Phase Locking.

Introduction to Recovery Protocols – Recovery Concepts, No-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging.

Learning Resource

Text Books

1. DATABASE SYSTEMS Models, Languages, Design and Application Programming, 6th Edition, Ramez Elmasri ,Shamkant B.Navathe , Pearson.

References

1. Data base System Concepts, 5th Edition, Abraham Silberschatz, Henry F Korth, S.Sudarshan,Mc Graw Hill.
2. Data base Management Systems, 3rd Edition, Raghurama Krishnan, Johannes Gehrke, TMH.
3. Introduction to Database Systems, 8th Edition , C.J.Date, Pearson